Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Life Underneath a Leidenfrost Drop AARON SHARPE, JUSTIN BURTON, ROELAND VAN DER VEEN, ANDRES FRANCO, SIDNEY NAGEL, The University of Chicago — Liquid drops deposited on a hot surface undergo a dramatic transition from boiling to levitating, a phenomena known as the Leidenfrost effect. The drops float on an insulating layer of evaporated vapor, which forms a pocket of high pressure underneath the drop and distorts the liquid-vapor interface. Experiments [1] have examined the lifetime and maximum size of such levitated drops. However, the interface beneath the drop has not been visualized or characterized. Using high-speed laser-light interference, we measure the geometry and fluctuations of the liquid-vapor interface. The interference fringes produced between the bottom surface of the liquid and the hot substrate provide information about the curvature of the vapor pocket beneath the drop as well as the azimuthal undulations along the rim that resides closest to the surface. We measure the speed, wavelength, and amplitude of the fluctuations as a function of the temperature of the substrate, as well as compare our results to recent theoretical predictions concerning the size of the vapor pocket for large drops [2].

[1] A. Biance, C. Clanet, D. Quéré, Phys. Fluids **15**, 1632 (2003).
[2] J. H. Snoeijer, P. Brunet, J. Eggers, Phys. Rev. E **79**, 036307 (2009).

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Date submitted: 21 Nov 2011 Electronic form version 1.4